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13. ABSTRACT (Maximum 200 words)

The RADHS program was inititated in 1980 at the suggestion of Frank Press, Science Advisor to the President. The objectives are to stimulate broader interest in minority communities in careers in science and engineering and to extablish individual working relationships of students with active researchers who may become helpful mentors when students need advice on college and careers and need letters of recommendations. This interim reprot covers the projects, and personnel participating in the AFOSR sponsored 1982 RADHS program directed by ABET.

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RADHS

1982

Program Funded by the
United States Air Force

Participating Schools

University of New Mexico
Ohio State University
Tuskegee Institute

Interim Report

F49620-81-C-0081

Roy B. Cowin

July 1982

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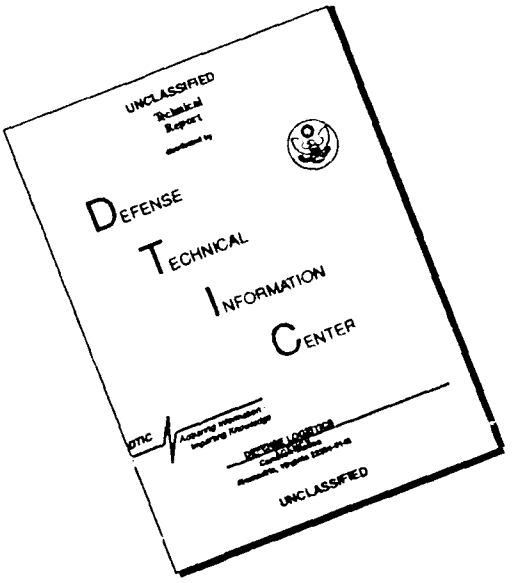

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University of New Mexico....Blue Section

Ohio State University.....Pink Section

Tuskegee Institute.....Yellow Section

Frank Press, Science Advisor to the President, stated in a memorandum dated October 23, 1979 that the Nation's and the Government's efforts to recruit and sustain minority students in science and engineering fields seems to have plateaued. Thus, it was suggested that the four departments and three agencies addressed should launch a program of apprenticeships in research laboratories for minority high school students, beginning with the summer of 1980.

In 1979 the Engineers' Council for Professional Development (ECPD) - now the Accreditation Board for Engineering and Technology (ABET) - conducted 53 minority oriented summer programs at 37 schools of engineering, four of which were conducted under a contract with the Air Force Office of Scientific Research (AFOSR). Thus, it was decided that the Air Force Research Apprenticeships for Disadvantaged High Schoolers (RADHS) should augment its Uninitiates Introduction To Engineering (UNITE) program being conducted at Massachusetts Institute of Technology, The University of New Mexico, Ohio State University, and Tuskegee Institute. In 1980 programs were held at each of the schools except MIT, and a total of sixty apprentice-mentors participated in these programs and repeated in 1981.

This report covers the 1982 mentor/student assignments by individual research projects to be pursued at each of the three participating institutions.

Selection of participants in RADHS was made by the program directors with the assistance of their colleagues. Mentors were secured with the assistance of the deans. Matching apprentice and mentor was done largely on the applicants response to the statement "Indicate why you want to participate in this program."

Each of the programs include classes in computer programming.

This year, projects at the University of New Mexico are being conducted in six departments with nearly half in the field of nuclear engineering. The majority of projects involve health, environment and vehicular traffic safety.

Eight departments at Ohio State University are involved in the 1982 RADHS program. The projects involve the use of electron microspopes, computers, and robotics and include air and ground vehicular safety.

Tuskegee Institute has involved four departments in RADHS projects - more than half in mechanical engineering. Numerous projects deal with energy conservation and alternative energy sources, protective clothing, and electrical safey.

This is an interim report and will be followed next with a report containing a post-program evaluation by the mentors and apprentices together with estimated costs.

APPENDIX A

Mentor-Apprentice Pairings

and

Program Descriptions

The University

of

New Mexico

1983 RADHS

AT UNIVERSITY OF NEW MEXICO

Mentor: Gu Wang-Chang

Apprentice: Andres Abeyta

Department: Chemical and Nuclear Engineering

(Attach brief vita, if not previously furnished.)

Address: 10514 Edith

Albuquerque, N.M. 87113

Phone: (505) 898-3980

Project: 3-D Numerical simulation for compressible subsonic fluid flo

Brief description:

One of the inestial confinement fusion researches which needs more exploration is the laser guided discharge channel for particle beams. The reactor chamber is filled with Helium sodium mixture to initiate this process, the flow patterns and sodium concentration gradient is examined. The results will prove the feasibility of laser guided discharge channel and upgrade the further researches.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: David Woodall (Craig Burkhart)

Apprentice: Mike Aragon

Department: Chemical and Nuclear Engineering

(Attach brief vita, if not previously furnished.)

Address: 506 El Dorado Dr.
Albuquerque, N.M. 87114

Phone: (505) 897-4744

Project: Plasma Gun Instumentation

Brief description:

A moving sheath of plasma is generated by a plasma gun. Diagnostic probe measurements are then used to determine fundamental parameters of the plasma sheath. The parameters of interest are, density, electron temperature, and ion temperature. Investigation will focus primarily on a high frequency langmuir probe, additionally, B probe measurements will be made.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: David W. Price

Apprentice: John Armenta

Department: Chemical and Nuclear Engineering

(Attach brief vita, if not previously furnished.)

Address: P.O. Box 284

Bloomfield, N.M. 87413

Phone: (505) 632-2[illegible]1

Project: Creation and Observation of a Plasma Erosion Switch

Brief description:

The purpose of the proposed work is to complete the experimental portion of my doctoral research during the summer. At present, my research involves the use of a high voltage pulsed power system (FRIZZ) to generate a voltage source on the order of 0.5 MV with the capacity of driving currents as high as 80 kA. My summer research will involve the interfacing of a Marshall-type plasma gun to the FRIZZ high voltage system to create conditions necessary to understand the physics of a plasma erosion switch.

The FRIZZ system is powered by a bank of 1.85 nF 60 kV storage capacitors. The capacitor bank is switched by means of a triggered two electrode spark gap. The back end of the FRIZZ is a pulse transformer that can step up the input voltage about a factor of 20. The voltage pulse will then travel through the FRIZZ until it reaches a self-triggering gas switch at the end of the FRIZZ. A voltage of about 10 times the input voltage will appear at the end of the FRIZZ machine. This voltage pulse will be applied to a high voltage magnetically insulated ion diode. In this configuration the voltage should remain on the diode until switched out. The plasma gun will provide the means to switch the diode.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Dr. Larry Barton

Apprentice: Janet Baca

Department: Biology, UNM

(Attach brief vita, if not previously furnished.)

Address: P.O. Box 401

Bernallilo, NM

Phone: (505) 867-5393

Project: Production of Hydrogen through Biophotolysis

Brief description:

Since hydrogen gas is considered to be an important fuel of the future, the production of hydrogen therefore becomes a primary concern. It is proposed that bacterial systems can be important in production of the hydrogen and this activity would have no adverse effect on the environment. The hydrogen production system which I am proposing is mediated by blue-green bacteria (formerly referred to as blue-green alge) and by sulfur oxidizing photosynthetic bacteria. By regulation of the environment these cells would switch from a biosynthetic mode of growth to a hydrogen production system. Although it has been known for many years that these two groups of bacteria can produce molecular hydrogen, the methods for hydrogen production have not been established. It is the purpose of this research to establish the conditions for maximal hydrogen production and examine the qualities of each system to determine which of the two photosynthetic bacterial systems should be pursued in the future.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Mourad El Begheidy

Apprentice: Edward Benally

Department: Chemical and Nuclear Engineering

Address: P.O. Box 38

(Attach brief vita, if not previously furnished.)

Canoncito, N.M. 87026

Phone: (505) 836-2529

Project: Enchancement of an Implantable Coated Wire Glucose Sensor

Brief description:

New approach for construtions and testing of a miniature in vitro and vivo implantable glucose sensor.

This approach is to use the principle of coated wire electrodes to monitor the glucose concentration in Buffer solutions, plasma and whole blood.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 16, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Douglas Smith

Apprentice: Leonard Casaus

Department: Chemical and Nuclear Engineering

Address: P.O. Box 447

(Attach brief vita, if not previously furnished.)

Bernallilo, N.M. 87004

Phone: (505) 867-5443

Project: Solidification During the Flow of Fluids: An Experimental and Theoretical Investigation.

Brief description:

The dynamics of a fluid freezing while flowing through a pipe our of interest for several practical reasons. Some of the areas for which a knowledge of this freezing process is important include:

1) Relocation of fuel during fission reactor accidents (i.e. partial core meltdown).
2) Hydrocarbon pipelines in cold climates.
3) Various industrial processes which require a change of phase such as the injection molding of plastics.

The problem of dynamic freezing has received only limited attention with most investigations being theoretical studies applied to a particular application. In this work, it is anticipated that a more through understanding of the basic mechanisms of pipeline freezing will be obtained. The time required for pipe blockage to occur will be determined for various flowrates, pipe diameters and fluids in an apparatus of the student's own design. It is hoped that a sufficient quantity of information will be obtained so as to result in a publication.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Ramesh Yelvarthy

Apprentice: Jacy Casaus

Department: Chemical and Nuclear Engineering

Address: P.O. Box [illegible] NM 8701

(Attach brief vita, if not previously furnished.)

Phone: (505) 289-3763

Project: Production of Ethanol From Wood Residues

Brief description:

The sawdust is treated with enzymes, which biochemically breaks it down into sugar. The sugar solution is then treated with yeast in a fermentation process, to yield ethanol after distillation. The enzyme is not used directly, but with the help of a cross linking agent, is immobilized on to glass beads.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Tucker Green

Apprentice: Camille Chavez

Department: Civil Engineering
(Attach brief vita, if not previously furnished.)

Address: P.O. Box 752
Bernallilo, N.M. 87004

Phone: (505) 867-5034

Project: Geochemical Investigations of Aqueous Contamination from Uranium Mine Backfilling

Brief description:

Limited disposal of uranium mill tailings in underground mine stopes (mines out ore deposits) is currently practiced in New Mexico. Many contaminants are associated with this material, therefore, significant potential exists for aquifer contamination. The investigation proposed is part of a continuing series of research projects conducted within the Department of Civil and Chemical Engineering, and the Department of Geology.

Specifically the student would be assisting in the collection of data needed to evaluate the potential for short and long-term water quality problems associated with this disposal practice. The current project is funded by the U. S. Bureau of Mines.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: James D. Brogan (J.W. Hall) Apprentice: Antoinett[illegible] Cordova

Department: Civil Engineering Address: P.O. Box [illegible]

(Attach brief vita, if not previously furnished.) Bernalillo, N.M. 87004

Phone: (505) 867-2963

Project: Fatal Traffic Accidents in New Mexico

Brief description:

New Mexico typically has the nation's highest rate of fatal traffic accidents. Previous research a UNM has examined the various roles which the highway/traffic engineer can play in reducing crash experience for selected subsets of accidents (e.g. overturning and guardrail crashes). Since other states have a better highway safety record that New Mexico, the proposed project will make use of detaiced computerized data on nationwide fatal accidents to compare our crash characteristics with those of remaining states. It is anticipated that the results of this project will provide meaningful guidance to highway safety decision makers within New Mexico.

Starting date as a RADHS project June 1, 1982

Estimate completion date as a RADHS project August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Alonzo D. Atencio, Ph.D.

Apprentice: Cathy Gallegos

Department: Biochemistry
(Attach brief vita, if not previously furnished.)

Address: General Delivery
Villanueva, N.M. 87583

Phone: None

Project: Metabolism of Antithrombin III

Brief description:

Antithrombin III is a plasma protein which inhibits the clotting enzyme thrombin. Recent studies indicate that the level of antithrombin in the circulation is closely linked to thrombotic episodes in people. The studies in my laboratory are designed to characterize the behavior of this protein in vivo. We are using the rabbit to develope our animal model.

The protein is purfied form rabbit plasma by affinity chromatography, labeled with radioactive iodine, and then injected intravenously. The disappearance of the injected protein is then monitored by sampling and radioactive counting, whole body counting and analyzing the data through mathmatical methods of systems analysis.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Farajollah Ghanbari

Apprentice: Paul Kabotie

Department: Chemical and Nuclear Engineering

Address: P.O. Box 1743
Espanola, N.M. 87532

(Attach brief vita, if not previously furnished.)

Phone: (505) 753-2585

Project: $^{65}Cu(n,2n)^{64}Cu$, $^{63}Cu(n,2n)^{62}Cu$ Cross Sections at 14.78 Mev.

Brief description:

Activation analysis provides a sensitive and rapid method for making qualitative and quantitative determinations. This method depends on the fact that any element can be bombarded with neutrons (or other particles) to produce a radioactive isotope. The radioisotope so formed will decay with a characteristic half life by emission of beta and/or gamma rays. The identity of an element can be established from the energy of these radiations. The basic requirement for an activation analysis system is a source of bombarding particles and a means for detecting and analyzing the emitted radiations.

The equipment to be used in the experiment is readily available in the Nuclear Engineering Laboratory UNM, however, certain modifications have to be made to adjust the systems for our particular project. These include the assemblage of the neutron generator, test anf calibration of hte parts, calibration of the detection systems, and performance of priliminary experiments.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Dr. Frank Williams

Apprentice: Martin Lorenzo

Department: Chemical and Nuclear Engineering

(Attach brief vita, if not previously furnished.)

Address: Box 994
Paguate N.M. 87040

Phone: (505) 552-6218

Project: 1) Liquefaction Catalyst Characterization 2) Catalyst Reactor

Brief description:

1) Measure chemisorption of CO and H_2 on precious metal catalysts for characterization of their coal liquifaction potential.

2) Build and use a high pressure reactor for catalytic reaction studies.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

Project: Invertigation of Nitrate Contamination in Private We

Brief description:

Private wells in the Mountain View Community of South
been contaminated by high nitrate (NO_3) concentrations
Recently concern for public safety has been increased
of a case of Methemoglobinemia in an infant. Subsequent
revealed nitrate concentrations nearly 30 times the estab
water standard of 10 mg N/L as NO_3.

Numerous theories have been proposed for these high
presence of abandoned landfills, old ammunition dumps
reservation, and former animal feed lots. One of the
is that the aquifer is hydraulically confined and human
water followed by subsequent disposal to septic tanks
results in recycling the water. The result is an increa
content with each pass.

The proposed project will involve a field study in which
from as many wells in the region as possible analyzed
for nitrates, chlorides and other indicators of human
values will be plotted on a map and isoconcentration lines
delineating the area of contamination. This will be supp
about the stratigraphy and water levels to determine the
and direction of flow of the contaminant plume.

Starting date as a RADHS project June

Estimate completion date as a
RADHS project Augu

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Jin J. Kim (Dennis Braden)

Apprentice: James Lujan

Department: Institute for Modern Optics
(Attach brief vita, if not previously furnished.)

Department of Physics & Astronomy

Address: P.O. Box 193
Penasco, N.M. 87553

Phone: (505) 587-2281

Project: Investigations of the Copper Vapor Laser Excited By a Fast Electical Dischar

Brief description:

The principal investigator is engaged in experimental work on the copper vapor laser with support from the National Science Foundation. In this work, innovative copper vapor lasers are designed and constructed in order to study the laser excited by a very fast electical discharge. The copper vapor laser is one of the most efficient lasers and it has potential to be the highest average power laser among the visible lasers. A high school student with a physics background can have an opportunity in this project to learn a great deal about the lasers in general and various experimental techniques involved in measurements and operations of laser characteristics in the real world.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Dr. Edward Reyes

Apprentice: Norma Montez

Department: Pharmacology

Address: 1605 Los Alamos Dr.
Albuquerque, N.M. 87102

(Attach brief vita, if not previously furnished.)

Phone: (505) 247-2180

Project: GTP A tool for early identification of FAS

Brief description:

The present study is undertaken to determine the effects of the [illegible] administration of alcohol on serum and brain γ-glutamyl transpeptidase in neonatal rats. Female Wistar rats will be bred to adult males and placed on a Bio Serv liquid diet containing alcohol or an isocaloric equivalent amount of carbohydrate in the form of dextrin, starting on day [illegible] of gestation. We have shown that a diet containing 6% v/v alcohol when administered in the above dosage regimen produces an animal model of Fetal Alcohol Syndrome (FAS) which manifests many of the characteristics seen in the human [illegible] diagnosed as having FAS.

The experiments to be performed are an attempt to determine [illegible] activity in neonates can be potentially utilized to aid in the early diagnosis of FAS. We will determine serum γ-GTP activity in neonatal rats who have been exposed to alcohol in utero and in their pair-fed controls. Polyacrylamide gradient gel electrophoresis will be performed on serum samples from each group of neonates to ascertain if alcohol treatment [illegible] aberrations in the zymograms similar to those produced by drinking rats. We will measure brain γ-GTP activity in each group of neonates and determine if alcohol treatment alters the ontogenic development of the enzyme in brain. We will also determine the time course required for the altered brain γ-GTP levels to return to normal.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: M. W. Wildin

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Tim Olona

Address: 805 Carlisle, S.E.
Albuquerque, N.M. 87106

Phone: (505) 268-4785

Project: Monitoring the Mechanical Engineering Building

Brief description:

This is a continuing project that involves use of computers and instruments to monitor and evaluate the performance of the ME Building, with emphasis on the performance of thermal storage. There are currently undergraduate students working on this project, and by summer I anticipate there will be a graduate student, also (maybe two, if our activity expands by that time.)

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Richard W. Mead (Vinod Rajagopalan) Apprentice: John Salcaito

Department: Chemical and Nuclear Engineering Address: 807 Towner Ave. N.W.
(Attach brief vita, if not previously furnished.)

Albuquerque, N.M. 87107

Phone: (505) 243-1717

Project: Leaching of Combusted Cores of Saline Zone Oil Shale

Brief description:

Oil shale from the saline zone contains various amounts of dawsonite and nahcolite. During retorting of the oil shale to recover a liquid hydrocarbon, these minerals are converted to soda ash and alumina. It is then possible to leach the Na and Al values from the cores and recover them as valuable byproducts. We have a study underway that is investigating the parameters affecting the leachability of the two minerals. We would like to recycle leach some of the cores that we have available to determine the rate of leaching. The student would be responsible for carrying out the leach studies and would gain experience in both the leaching and the analytical chemistry involved.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Lawrence C. Sanchez

Apprentice: Steven Sanchez

Department: Chemical and Nuclear Engineering

(Attach brief vita, if not previously furnished.)

Address: 330 N. Campo St.

Las Cruces N.M., 88001

Phone: (505) 524-0528

Project: Vacuum System Desgins For Fusion Studies

Brief description:

1) The student will be required to study various vacuum systems necessary to perform low pressure experiments.

2) The student will help build wacuum system for current plasma (ionized gas) experiments.

3) The student will help in debugging computer codes (requiring hand calculations of analytical solutions).

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Andrew O. Martinez

Apprentice: Tom Sisneros

Department: Microbiology

(Attach brief vita, if not previously furnished.)

Address: P.O. Box 384

Bernalillo, N.M. 87004

Phone: (505) 867-5125

Project: "Genetic Analysis of Cell Proliferation"

Brief description:

Normal human somatic cells have finite replicative life-spans when cultured in vitro. The studies conducted in my laboratory attempt to elucidate the role of the nucleus and cytoplasm in cell proliferation by heteroplasmon, nuclear transplantation, cybridization, and cell reconstitution experiments between old cells and both normal diploid and heteroploid actively replicating cells. The general hypotheses being tested is that cellular aging is amenable to genetic reprogramming.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

1982 RADHS

AT: UNIVERSITY OF NEW MEXICO

Mentor: Dr. Charles F. Hawkins (Pat Day)

Department: EECE

(Attach brief vita, if not previously furnished.)

Apprentice: Pat Tarin

Address: Rt. 1 Box 451-C

Belen, N.M. 87002

Phone: (505) 864-4288

Project: Cardiac Audiometry

Brief description:

Computer analysis of electrocardiograms to assess a technique to determine hearing in newborn infants.

Starting date as a RADHS project: June 1, 1982

Estimate completion date as a RADHS project: August 6, 1982

Ohio State University

1982 RADHS

AT: The Ohio State University

Mentor: Dr. D. McDonald

Department: Metalurgical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Melanie Berg

Address: 1111 N 17th St.
Harrisburg, PA 17103

Phone:

Project: Development of Alloys in Aluminum Air Batteries for Motor Vehicles

Brief description:

The study of principles, preparation of alloys and speciments for the scanning election microscope.

Starting date as a RADHS project 6/22/82

Estimate completion date as a RADHS project 8/13/82

RETURN BY JULY 1 1982

1982 RADHS

AT: The Ohio State University

Mentor: Dr. H. Weed

Department: Bio-Medical Center
(Attach brief vita, if not previously furnished.)

Apprentice: Sheila Brown

Address: 7518 Dundalk Rd.
Takoma Park, MD 20912

Phone:

Project: Development of Hardware and Software Projects

Brief description:

There will be four specific hardware projects to build and four software programs written by each apprentice.

Starting date as a RADHS project: 6/22/82

Estimate completion date as a RADHS project: 8/13/82

RETURN BY JULY 1 1982

1982 RADHS

AT: The Ohio State University

Mentor: Dr. G.R. St. Pierre

Apprentice: David Bumpus

Department: Metallurgical Engineering
(Attach brief vita, if not previously furnished.)

Address: 79 Ray St.
Freeport, NY 11520

Phone:

Project: The structure of carbon deposits on metal surfaces and the kinetics of the formation of carbon filaments

Brief description:

The students will study subject matter as it relates to physics, make measurements, analyze data and learn to use a balance and electron microscope.

Starting date as a RADHS project 6/22/82

Estimate completion date as a RADHS project 8/13/82

RETURN BY JULY 1 1982

1982 RADHS

AT: The Ohio State University

Mentor: Dr. Richard Christensen

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Trent Crouch

Address: 2348 Springhill St.
Inkster, MI 48141

Phone:

Project: Construction of the two wind tunnels and laboratory clean-up

Brief description:

He will be involved in construction of the two wind tunnels and laboratory clean-up. (Clean-up consists of arranging equipment and supplies in storage cabinets for easy access.) Trent will also be working in the Advanced Design Methods Laboratory (ADML) developing a computer program that will receive data from a data link.

Starting date as a RADHS project 6/21/82

Estimate completion date as a RADHS project 8/13/82

1982 RADHS

AT: The Ohio State University

Mentor: Dr. David Green

Apprentice: Darian Curry

Department: Engineering Graphics
(Attach brief vita, if not previously furnished.)

Address: 28836 Beech Avenue
Inkster, MI 48141

Phone:

Project: Space Utilization & Alternatives

Brief description:

Analysis of laboratory and classroom space. Students will make drawings of current space utilization and alternatives taking into account good human factor guidelines.

Starting date as a RADHS project 6/22/82

Estimate completion date as a RADHS project 8/13/82

RETURN BY JULY 1, 1982

1982 RADHS

AT: The Ohio State University

Mentor: Dr. Stuart Collins

Department: Electrical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Leonard Evans

Address: 2714 Berwick Blvd
Columbus, OH 43209

Phone:

Project: Optical Computing

Brief description:

Students will set up and test optical devices, construct apparatus and perform simple machine shop work.

Starting date as a RADHS project 6/22/82

Estimate completion date as a RADHS project 8/13/82

RETURN BY JULY 1 1982

1982 RADHS

AT: The Ohio State University

Mentor: Dr. Thomas Rockwell

Department: Industrial & Systems Eng.
(Attach brief vita, if not previously furnished.)

Apprentice: Freddy Hankerson

Address: 2903 Amber Court

Columbus, OH 43227

Phone:

Project: NASA RF - 713729

Brief description:

Study of pilot's behavior during critical in flight events.

Starting date as a RADHS project 6/22/82

Estimate completion date as a RADHS project 8/13/82

1982 RADHS

AT: The Ohio State University

Mentor: Dr. Keith Bedford

Department: Civil Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Sheryl Jackson

Address: 2795 Pamella Drive

Columbus, OH 43207

Phone:

Project: The Movement of Polutants through Water

Brief description:

The project will involve short trips to Sandusky Bay. The student will work with a graduate student. The student will be collecting water samples and helping to analyze data.

Starting date as a RADHS project 6/22/82

Estimate completion date as a RADHS project 8/13/82

1982 RADHS

AT: The Ohio State University

Mentor: Dr. Karl Graff

Department: Welding
(Attach brief vita, if not previously furnished.)

Apprentice: George Kyle

Address: 1409 Lawrence Rd N.E.
Canton, OH 44705

Phone:

Project: Survey of Welding Engineering

Brief description:

First, the student will receive formal instruction in welding engineering. Subjects covered include welding terms, electrical power supplys, arc physics, and general problems involved in welding. Actual demonstrations used in conjunction with materials covered.

Second, the student will learn basic metallographics techniques: grinding, polishing, and etching of steel samples for examination of Laser Welding. Examination and photomicrography of these speciments will also be undertaken.

Starting date as a RADHS project 6/22/82

Estimate completion date as a RADHS project 8/13/82

1982 RADHS

AT: The Ohio State University

Mentor: David Green

Department: Engineering Graphics
(Attach brief vita, if not previously furnished.)

Apprentice: April Love

Address: 1016 Lane Blvd

Kalamazoo, MI 49001

Phone:

Project: Space Utilization and Alternatives

Brief description:

Analysis of laboratory and classroom space. Students will make drawings of current space utilization and alternatives taking into account good human factor guidelines.

Starting date as a RADHS project 6/22/82

Estimate completion date as a RADHS project 8/13/82

RETURN BY JULY 1 1982

1982 RADHS

AT: The Ohio State University

Mentor: Dr. H. Weed

Apprentice: Terri Montague

Department: Bio-Medical Center
(Attach brief vita, if not previously furnished.)

Address: 9004 Jones Mill Rd.
Chevy Chase, MD 20815

Phone:

Project: Development of Hardware and Software Projects

Brief description:

There will be four specific hardware projects to build and four software programs written by each apprentice.

Starting date as a RADHS project: 6/22/82

Estimate completion date as a RADHS project: 8/13/82

RETURN BY JULY 1, 1982

1982 RADHS

AT: The Ohio State University

Mentor: Dr. Umit Ozguner

Department: Electrical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Timothy Murphy

Address: 896 Union Rd.
Xenia, OH 45385

Phone:

Project: Modeling and Controlling Small Robot Arm

Brief description:

The design and building of micro processor based controller for the arm

Starting date as a RADHS project 6/22/82

Estimate completion date as a RADHS project 8/13/82

1982 RADHS

AT: The Ohio State University

Mentor: Dr. Gary Kinzel

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: April Portee

Address: 4832 W. Erie St.
Chicago, IL 60644

Phone:

Project: Development of Software to Support Undergraduate Instruction

Brief description:

The work will be concentrated in two areas: software to support an introductory course in computer aided design and software for an interactive flowcharting routine the 2nd part of the project will involve the development of a flowcharting program for general computer programs. This program will be interactive and will permit the flowchart to be changed at a later date.

Starting date as a RADHS project 6/21/82

Estimate completion date as a RADHS project 8/13/82

1982 RADHS

AT: The Ohio State University

Mentor: Dr. Z. A. Nemeth

Department: Civil Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Michael Rayfield

Address: 1689 Franklin Pk. S

Columbus, OH 43205

Phone:

Project: Development of Driver Based Method for the Evaluation of Traffic Control Systems for Freeway Construction and Maintenance

Brief description:

The student is involved in the computer analysis and reduction of traffic data collected during the testing of new experimental signs for freeway work zones. The data reduction involves taking observations from frame by frame replay of film taken during experiments, displayed on a video monitor. This work will be done with a high degree of precision.

The analysis of data involves transforming the raw data obtained from video display into sets of vehicular speeds and headways along various locations in the construction zone by means of some previously developed computer programs. It also involves working with some statistical computer packages.

Starting date as a RADHS project 6/21/82

Estimate completion date as a RADHS project 8/13/82

RETURN BY JULY 1 1982

1982 RADHS

AT: The Ohio State University

Mentor: Andrew Terzouli

Department: Electrical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Michelle Robinson

Address: 29677 Spring Arbor Dr.
Inkster, MI 48141

Phone:

Project: Underground Mapping System

Brief description:

Using two antennas (a dipole and spiral) you map the ground to locate objects underground We then process the map in order to discover what objects are pipes and which objects are rocks or clutter. This system is being developed in order to help the utility companies know what is in the ground before they dig it up.

Starting date as a RADHS project 6/22/82

Estimate completion date as a RADHS project 8/13/82

RETURN BY JULY 1 1982

1982 RADHS

AT: The Ohio State University

Mentor: Dr. George Smith

Apprentice: Mary Smith

Department: Industrial & Systems Engineering
(Attach brief vita, if not previously furnished.)

Address: 29855 Hazelwood
Inkster, MI 48141

Phone:

Project: Ohio Department of Highway Safety

Brief description:

Affect of deleneators on drivers ability to see curves at night by taking measurements and analysing data

Starting date as a RADHS project: 6/22/82

Estimate completion date as a RADHS project: 8/13/82

RETURN BY JULY 1 1982

1982 RADHS

AT: The Ohio State University

Mentor: Dr. Gregorek

Apprentice: Jeffery Story

Department: Aero-Astro Engineering
(Attach brief vita, if not previously furnished.)

Address: 2007 Jane Ave.
Columbus, OH 43219

Phone:

Project: Wind Tunnel Experiments

Brief description:

Experimentation in wind tunnels analysis and comparison of drag on small model rockets

Starting date as a RADHS project 6/22/82

Estimate completion date as a RADHS project 8/13/82

RETURN BY JULY 1 1982

1982 RADHS

AT: The Ohio State University

Mentor: Dr. Michael Bragg

Department: Aero-Astro Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Andre Willis

Address: 831 Kimberly Circle
Oberlin, OH 44074

Phone:

Project: Wind Tunnel Experiments

Brief description:

Experimentation in wind tunnels. Analysis and comparison of drag on small model rockets.

Starting date as a RADHS project: 6/22/82

Estimate completion date as a RADHS project: 8/13/82

RETURN BY JULY 1 1982

Tuskegee Institute

1982 RADHS

AT: Tuskegee Institute

Mentor: Donald C. Fuhr

Department: Electrical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Taurus Brackett

Address: Rt. 1 Box 161
Pine Hill, AL 36769

Phone: (205) 963-4815

Project: Conversion of Hewlett-Packard 2100 programs for use on DEC VAX-11/750

Brief description:

Phase I: During this phase, the student will learn or review the fundamentals of the BASIC computer programming language, emphasizing techniques for program debugging.

Phase II: During this phase the student will, for as many programs as time allows:

a) Copy the program from the HP-2100 to the VAX.
b) Compile and test for proper operation.
c) Make any changes necessary for execution on the VAX
d) Add enhancements for more efficient or effective operation.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: Dr. Ira G. Dillon

Department: Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Nyrshea Butts

Address: 2932 School Street

Columbus, GA 31906

Phone: 404 563 3343

Project: Determination of Permeation of Hazardous Chemicals through Protective Clothing.

Brief description:

A permeation test cell developed by the F-23 Committee of the American Society for Testing Materials (ASTM) is used to determine the permeation of hexane through polyvinyl alcohol glove material.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 1, 1982

1982 RADHS

AT: _____

Mentor: Ernest A. Grant, Jr.

Department: Electrical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Theodore C. Dixie, Jr.

Address: 3602 Maggie Avenue
Huntsville, Alabama 35810

Phone: 205-859-2436

Project: MICROPROCESSOR CONTROLLED EARTH STATION TURO RECEIVER

Brief description:

A TI 990 Microprocessor System and a Software Controlled Interface is used to control TVRO receiver /[illegible]Time/Tone switching, video services, auxiliary, services, and Optimization of TVRO System Performance.

Starting date as a RADHS project: June 1 - 1982

Estimate completion date as a RADHS project: July 31, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: R. M. Jenkins

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Adrain Dudley

Address: 1228 Bush Circle
Birmingham, AL 35208

Phone: (205) 780-4316

Project: (a) Tests with Water Table Apparatus (b) Flow Measurement (c) Concentrating Solar Heat Collector Tests.

Brief description:

Phase I: Conduct tests on water table apparatus; evaluation of results.

Phase II: Flow measurement tests using orifice plates, etc.; application to vortex controlled diffusers.

Phase III: Tests on concentrating heat collector arrays under different vacuum conditions.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 1, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: R. P. Ramirez

Apprentice: Carla Gayle

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Address: 717 Alvarez Ave.
Whistler, AL 36612

Phone: (205) 456-1003

Project: Conversion of Hewlett-Packard 2100 programs for use on DEC VAX-11/750

Brief description:

Phase I: During this phase, the student will learn or review the fundamentals of the BASIC computer programming language, emphasizing techniques for program debugging.

Phase II: During this phase the student will, for as many programs as time allows:

a) Copy the program from the HP-2100 to the VAX.
b) Compile and test for proper operation.
c) Make any changes necessary for execution on the VAX
d) Add enhancements for more efficient or effective operation.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 1, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: I. Mohiuddin

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Constance Goshea

Address: P. O. Box 242

Hurtsboro, AL 36860

Phone: (205) 667-7516

Project: (a) Tests on Vortex Controlled Diffuser (b) Tests on a One-half Ton Heat Pump
(c) Tests on Water Table Apparatus

Brief description:

Stage I: Application of flow measurement techniques in vortex controlled diffusers.

Stage II: Building and performing tests on a heat pump.

Stage III: Performance of tests on a water table apparatus. Evaluation of results.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 1, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: Benjamin O. Okeke

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Jennifer Hatcher

Address: Rt. 2, Box 207
Midway, AL 36053

Phone: (205) 738-3486

Project: Experimentation with Flat-Plate Collectors and Construction and Testing of a Trough-Type Solar Concentrator.

Brief description:

Phase I: The apprentice is first introduced to the basic experimental research methods (flow measurements, temperature measurements, measure measurements, etc.) and to the current research going on in the area of energy (solar and coal).

Phase II: He then engages in hands-on experimentation with flat-plate solar collectors and in an extensive role in the construction and testing of a large trough-type solar concentrator. Writing of technical reports is an integral part of this phase.

Phase III: In the final phase, he tries some more experiments with the wind tunnel and a laboratory steam power plant.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 1, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: B. O. Okeke/W. F. Clayton

Department:
(Attach brief vita, if not previously furnished.)

Apprentice: Morgan Hill

Address: Rt. 6, Box 574

Phenix City, AL 36867

Phone: (205) 298-6705

Project: Experimentation with Flat-Plate Collectors and Construction and Testing of a Trough-Type Solar Concentrator.

Brief description:

Phase I: The apprentice is first introduced to the basic experimental research methods (flow measurements, temperature measurements, measure measurements, etc.) and to the current research going on in the area of energy (solar and coal).

Phase II: He then engages in hands-on experimentation with flat-plate solar collectors and in an extensive role in the construction and testing of a large trough-type solar concentrator. Writing of technical reports is an integral part of this phase.

Phase III: In the final phase, he tries some more experiments with the wind tunnel and a laboratory steam power plant.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 1, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: G. N. Kumar

Apprentice: Ovetta Hobson

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Address: Rt. 1, Box 574
Sawyerville, AL 36776

Phone: (205) 624-3546

Project: (a) Energy Management Studies (b) Aerodynamic Testing (c) Cross Flow Heat Exchange Performance Tests.

Brief description:

Part I: Energy Management Studies: Performance tests on a few air conditioning plants on campus. Evaluating their performance and attempt to improve their efficiency.

Part II: Performing tests to determine the effect of angle of attack on lift and drag coefficients on an airfoil. Comparison with the analytical predictions will also be made.

Part III: Performance test on cross flow heat exchange for different arrangement of bundles.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 1 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: A. Olas

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Yvonne Hollis

Address: 507 Brandon Avenue
Linden, AL 36748

Phone: (205) 295-4139

Project: Design of Involute Gears

Brief description:

Phase I: The student will learn about the basics of theory of machines, read and know about properties and methods of drawing the involute; use equations of the involute to draw it for given values of parameters.

Phase II: The student will perform a series of experiments using a blackboard, chalk, and a disc with wrapped cord to draw involute. The student will analyze the motion of the pulleys, observing that the pulleys turn in opposite directions and that if the rotational motion of the driving pulley is uniform, the motion of the driven pulley is also uniform.

Phase III: The student will design and make the experiment to demonstrate the above fact, using the concept of involutes design and make the models of two teeth of gears in mesh, using plexiglass.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: Amjad Sheikh (G. N. Kumar)

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Robert Holt

Address: 5322 Braeburn Street
Columbus, GA 31907

Phone: (404) 563-0692

Project: (a) Construction of Concentrating Solar Collector (b) Fabrication of a One-Half Ton Heat Pump.

Brief description:

Part I: Construction and testing of a concentrating solar collector using burnt out flourescent tubes, etc. (under different vacuum conditions).

Part II: Construction and testing of a heat pump to perform both heating and cooling operations.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 2, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: Sunday aAdalumo

Department: Electrical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Sanford E. Jeames

Address: 202 2nd Avenue
Eutaw, AL 35462

Phone: 205-372-4523

Project: Study Degradation of Insulating Materials

Brief description:

Insulating materials deteriorate under the action of corona and high voltages. Study the basic experimental methods used in the measurement of high voltages, partial discharges and corona. Design high voltage voltmeter to replace the existing panel meter. Calibrate the high voltage voltmeter using a standard voltmeter. Study the basic principles of electric circuits. Use the corona detection equipment to measure the partial discharges from high voltage connectors and minimize them.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 1, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: Mr. N. Muruganandam

Department: Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Joseph Jones

Address: 505 Hightower Rd.
Atlanta, GA 30318

Phone: 404-794-6260

Project: Determination of Permeation of Hazardous Materials through Protective clothing.

Brief description:

A permeation test cell developed by the F-23 Committee of the American Society for Testing Materials (ASTM) is used to determine the permeation of hexane through polyvinyl alcohol glove material.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 1, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: Dennis A. Likens

Department: Physics
(Attach brief vita, if not previously furnished.)

Apprentice: Marcia R. Jones

Address: 469 Campbell Drive
Tuskegee, AL 36083

Phone: (205) 727-3242

Project: Designing Introductory Physics Experiments to use a Microcomputer

Brief description: This projectis intended to extend the use of the Commodore VIC-20 microcomputer into the general physics teachings laboratory. This summer will be used to explore some of the basic applications. Since the VIC-20 is inexpensive, easy to program in basic, quite durable and portable, and is easy to interface to other equipment, it should be a good fundamental laboratory tool.

Phase I: During this phase, the student will learn to program the VIC-20 computer, and learn about microcomputers in general. The apprentice will spend her time learning to program and operate the Commodore VIC-20 and will learn about microcomputers in general. The apprentice will have both a VIC-20 and a Heath-Zenith ET3400 microprocessor to use. Complete learning guides to both will be provided for her use. This part of the project should take about three weeks.

Phase II: This phase will be based upon how to use data obtained in the physics laboratory. Several programs will be developed to graph data, determine the proper equations, and use error analysis. The apprentice will be expected to do much of the programming and evaluation of the programs.

Phase III: This phase will be the portion interfacing to the real world. The VIC-20 has built in analog to digital converters. In this portion, experiments will be devised to actually use the computer to capture and record experimental data. Data could be in the form of timings or analog voltages. Programs and circuits to use the computer will be developed during this last part of the summer program.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 1, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: Robert K. Jones

Department: Electrical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Ronald K. Jones

Address: 1009 Peyton Avenue
Jackson, Ms 39209

Phone: 601-969-6651 or 601-948-542

Project: Design & Fabrication of Pedal-Powered Recreation Boat

Brief description:

Purpose(s): (1) To provide alternative to polluting motor boats on Lake Tuskegee, which is only 200 acres.
(2) To demonstrate feasibility of low-technology manufacturing operations in economically-depressed Tuskegee, Ala.

Tasks: (1) Thoroughly understand Archimedes Principle and the concept of buoyancy.
(2) Do preliminary sketches for p^2Boat. Estimate required pontoon volume using 40#/cu ft estimate for wood and fiberglass construction.
(3) Estimate materials required. Locate material sources, and locate shop facilities.
(4) Learn fiberglass application technique. Build pontoons and test for leaks and buoyancy.
(5) Complete design and fabrication of paddle-wheel and deck structure. Attach pontoons and test.
(6) Document entire project. Make cost projections for producing 2 boats/week. Speculate on other wood/fiberglass products feasible for manufacture in Tuskegee.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 1 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: S. Jeelani

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Brenda McDade

Address: 300 Bulls Avenue
Tuskegee Institute, AL 36088

Phone: (205) 727-2245

Project: Design of Load Cell and Calibration of the Universal Testing Machine

Brief description:

Stage I: The student will learn the methods of measurement of force and the construction and function of a strain gauge.

Stage II: The student will design a tension specimen, mount a strain gauge, and conduct tests for the measurement of various loads.

Stage III: The student will design a load cell and calibrate it. The load cell will be used to calibrate the universal testing machine.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: H. Majlessi/P. Mohazzabbi

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Dwannal McGahee

Address: P. O. Box 33
Abbeville, AL 36310

Phone: (205) 585-5289

Project: Modification of the Present Heated Tank in Order to Study the Effect of Agitation on Heat Transfer Properties.

Brief description:

Phase I: To use the library to study the basic principles in heat transfer and learn the techniques involved in using different equipment to modify the present heated tank.

Phase II: In this period, the student will have to:

1. Fabricate the necessary stand for heated tank.
2. Modify the inside and outside of the tank.
3. Put insulation around the tank and hoop up 4 thermometers and a pressure gauge.
4. Install an electric stirrer.

Phase III: Makes several tests and detects any steam leakage. Using steam at different temperatures, measures the liquid temperature at different time intervals and record the results.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 1, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: I. K. Kothari

Department: Physics
(Attach brief vita, if not previously furnished.)

Apprentice: Elma Penn

Address: 642 Parker Dr.
Eufaula, AL 36027

Phone: (205) 687-4985

Project: Crystal Structure Studies

Brief description:

1. Programmed self study of basic crystal structures' symmetries; axial, planar symmetries, packing.
2. Make models of five basic crystal structures, simple cubic, FCC, BCC, Rhomboid, Hexagonal, Hexagonal close-packed.
3. Passage of waves through crystals. Programed self study.
4. Experiment. Behavior of mechanical waves (water waves) through a model crystal
5. Crystal defects (bubble model) film study observations.
6. Bragg's Law. defraction and crystal structure, planes. Self study.
7. Experiment. Behavior of electromagnetic waves (microwaves) through a model crystal.
8. Writing report.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

RETURN BY JULY 1, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: M. Musial

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Jennifer Purter

Address: 311 Roe Buck Avenue
Eutaw, AL 35462

Phone: (205) 372-3771

Project: Design of Load Cell and Calibration of the Universal Testing Machine

Brief description:

Stage I: The student will learn the methods of measurement of force and the construction and function of a strain gauge.

Stage II: The student will design a tension specimen, mount a strain gauge, and conduct tests for the measurement of various loads.

Stage III: The student will design a load cell and calibrate it. The load cell will be used to calibrate the universal testing machine.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: P. K. Ray

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Ada Marie Simpson

Address: 8012 Nicewood Rd.
Glen Allen, VA 23060

Phone: (804) 262-5563

Project: Analysis and Design of a Rail Gun

Brief description:

Weeks 1 & 2:	During this period, the student will read and prepare background information on projectile motion, why we need projectiles at high speed, introduction to the mass driver and rail gun, the principle on which they operate, and their limitations.
Weeks 3 & 4:	During this period, the student will learn about different components of the rail gun, e.g., power supply, power processor, inductor pulse shaping, plasa armature, etc.
Weeks 5, 6, & 7:	During this period, the student will write a computer program incorporating in design equations, evaluation of rail gun characteristics for various projectile mass, and specific impulse.
Week 8:	During this period, the student will tabulate results and plot characteristic graphs.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: M. Aslam

Apprentice: Monica Smith

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Address: Rt. 2, Box 118-A
Tuskegee, AL 36083

Phone: ----------

Project: Design of Load Cell and Calibration of the Universal Testing Machine

Brief description:

Stage I: The student will learn the methods of measurement of force and the construction and function of a strain gauge.

Stage II: The student will design a tension specimen, mount a strain gauge, and conduct tests for the measurement of various loads.

Stage III: The student will design a load cell and calibrate it. The load cell will be used to calibrate the universal testing machine.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: H. Majlessi

Department: Chemical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Peter J. Smith

Address: Rt. 1, Box 224D

Shorter, AL 36075

Phone: 727-1490

Project: Construction and Study of a Weir

Brief description:

Phase I: To use the library to study the fundamentals and principles involved in fluid flow and learn the techniques involved in using different equipment to construct a weir which will be used for collection of data such as fluid velocity, Head pressures, et .

Phase II:

1. Design of a weir
2. Construction of the above design
3. Construction of different shape openings (such as triangular, rectangular, v-notch, etc.)
4. Installation of Head measuring device

Phase III: Make several tests using different Head and different shape openings in order to measure the fluid velocity, etc.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982

1982 RADHS

AT: Tuskegee Institute

Mentor: P. M. Sagdeo

Department: Mechanical Engineering
(Attach brief vita, if not previously furnished.)

Apprentice: Ruby Turner

Address: Rt. 1, Box 68-B
Catherine, AL 36728

Phone: (205) 627-3677

Project: Design and Fabrication of an Engine Test Stand

Brief description:

Phase I: During this phase, the student will learn the basics of I. C. engines and study the various components of engines. The student will also visit the laboratory to study some actual engine test stands.

Phase II: In this phase, the student will design a test stand for a Cummins VT225 6-cylinder Diesel engine.

Phase III: In this phase, the student will assist in the fabrication of the stand and installation of the engine.

Starting date as a RADHS project: June 7, 1982

Estimate completion date as a RADHS project: July 31, 1982